
पेट्रोलियम और उसके उत्पाद — परीक्षण
पद्धतियाँ

भाग 13 लोवीबॉन्ड टिंटोमीटर द्वारा रंग

(पहला पुनरीक्षण)

Petroleum and its Products —
Methods of Test

Part 13 Colour by Lovibond Tintometer

(First Revision)

ICS 75.080

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FOREWORD

This Indian Standard (Part 13) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Methods for Sampling and Test for Petroleum and Related Products of Natural or Synthetic Origin (excluding Bitumen) Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

Colour is an important indicator of quality for petroleum products. A color range can be used for monitoring contamination and quality control.

This standard originally published in 1960, was based on IP 17/52. The first revision has been brought out to keep pace with the latest technological developments and international practices. In this revision following major changes have been made:

- a) Method B 'Measurement of colour in IP unit' has been removed; and
- b) Scope, colour standards and procedure clauses have been updated.

In the preparation of this standard, considerable assistance has been derived from IP 17/10 'Determination of colour — Lovibond tintometer method' issued by Energy Institute, UK.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'.

Indian Standard

PETROLEUM AND ITS PRODUCTS — METHODS OF TEST

PART 13 COLOUR BY LOVIBOND TINTOMETER

*(First Revision)***1 SCOPE**

1.1 This standard is prescribed method of test for the determination of colour of practically all petroleum products (dyed or undyed) except black oils. The solid and semisolid products such as petrolatum and waxes are tested in the molten state. The colour of the material is determined by comparison with a series of red, yellow, and blue standard colour glasses.

1.2 With the series red, yellow and blue glasses, the instrument functions as a trichromatic calorimeter, and may be used to measure the depth of colour in Lovibond units.

2 PRINCIPLE

2.1 Light reflected from a white background passes through the cell containing the sample, and thereafter to the viewing tube, where it illuminates one-half of the field of view. The other half of the field of view is illuminated by light from the background, which passes through the colour standards.

2.2 The value of the standard or combination of standards which gives the best match is recorded as the colour of the material.

2.3 A blue 'daylight' filter is incorporated in the viewing tube. In older models of the apparatus, blue diffusing screens are fitted in the light cabinet and there are no colour filters in the viewing tube.

2.4 If the material is too bright to be matched by the standard glasses, its colour is dulled by interposing glasses of neutral tint between the sample and the viewing tube.

2.5 The numerical values of the red, yellow, and blue colours in Lovibond units are additive, and are related so that equal amounts of the three colour make a neutral or grey tint.

3 APPARATUS**3.1 Lovibond Tintometer**

Lovibond tintometer shall be capable of measuring the colour. New instruments are more specific for the determination of the colour are more compliant to verification. Diagram of the current instrument is given in Fig. 1. Older Lovibond tintometers of the BDH pattern having single coil pearl lamps, are still acceptable.

3.2 Colour Standards

Lovibond units. The series of glasses are detailed as below:

- a) Red and yellow — 0.1 to 0.9, 1 to 9, 10 to 70;
- b) Blue — 0.1 to 0.9, 1 to 9, 10 to 40; and
- c) Neutral tint — 0.1 to 0.9, 1, 2 and 3.

3.3 Optical Cells**3.3.1 Sample Cells for Liquids**

Having suitable path length with plane-parallel glass ends. Sample cells of 25.4 mm, 50.8 mm, 76.2 mm, 101.6 mm and 152.4 mm path length are commonly used for petroleum products. Sample cells of shorter path length can also be used.

3.3.2 Sample Cells for Waxes

Made of metal with glass end-plates or entirely of borosilicate glass, to hold out heating to 100 °C without distortion.

4 PRECAUTIONS

Determinations shall be made only by persons of normal colour vision and experienced in the use of the instrument.

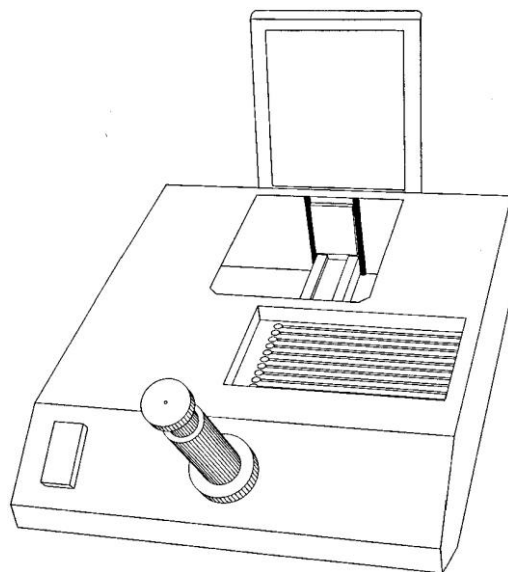


FIG. 1 LOVIBOND TINTOMETER

5 PREPARATION OF SAMPLE

5.1 If it is not possible to test the samples as soon as they are taken, store them as far as possible, in the dark and under conditions which do not lead to colour instability.

5.2 Immediately before testing them, filter all samples through a medium texture filter paper, at the temperature at which the colour is to be determined, suction may be applied if necessary.

If samples are tested at temperatures lower than that at which they are filtered, they may develop a cloudiness which would interfere with the determination of their colour.

6 TEST ROOM

Use the tintometer in a moderately lighted room (not a dark room) and place it so that the operator is facing a blank wall of white, cream, or pale neutral tint. Choose the height of the work bench and the placing of the instrument so that observations can be made comfortably. Colour discrimination depends a great deal on the conditions of observation, and it is, therefore, essential that due regard be given to these precautions.

7 PREPARATION OF APPARATUS

7.1 Verify the performance of the instrument and the discrimination of the operator at the time of taking instrument in service and then at prescribed intervals in the laboratory quality control procedure by using calibrated glass or liquid reference standard with certified Lovibond RYBN colour values and optical

path length.

7.2 For older instruments, where the single-coil pearl lamps are used, replace if any degradation is observed, if there is any inconsistency in tests results or if the life of the lamp is greater than 100 h.

7.3 For new instruments using tungsten-halogen light sources, they need to be replaced only upon failure.

CAUTION — Do not contact a tungsten-halogen light source with the skin, even when off.

8 PROCEDURE

8.1 Choose a cell of such a path length that it gives a colour whose principal component has a value of at least one unit, but which does not require more than 20 units of red for a match. It is desirable to restrict the colour intensity to less than a total of 40 units for optimum colour discrimination. A shorter path length minimize colour saturation and increases precision.

8.2 Follow manufacturer's instructions to set up the instrument and place the case having the racks of colour slides appropriately and complete with the required slide selection.

8.3 Select the cell and fill the filtered sample at the selected temperature. If the sample temperature is significantly above ambient, bring the temperature of cell to the same temperature of sample before filling and maintain the temperature during the test by using cell heaters. Avoid sample cooling during measurement as it may give inaccurate results or

difficulty in obtaining any colour match.

8.4 Place the cell in the instrument in the moulded channel with one face against the opening of the eyepiece end. Look down the eyepiece, and obtain an approximate match for the hue of the sample by introducing appropriate amounts of two of the colours, for undyed products; these will normally be red and yellow.

8.4.1 If the sample appears brighter than the combination of Lovibond glasses, that is, if the glasses appear dull by comparison, superimpose the neutral tints over the sample in order to bring it to the same brightness level as the colour glasses.

8.4.2 If the sample appears duller than the colour glasses, introduce blue tints to the glasses.

8.4.3 When the three primaries (red, yellow and blue) are used together in this way, they combine to produce grey and, therefore, in no circumstances may neutral tints be used over a material when all three colours are used in the other field, as this would mean that grey had been added to both sides.

8.5 When a brightness balance has been obtained it

will probably be necessary to adjust the other glasses slightly in order to obtain the best match of both hue and brightness in the two fields. Do not gaze into the eyepiece longer than is necessary, as fatigue reduces colour discrimination. After making a match, rest the eyes by looking away for a few minutes, and then recheck the match, revising it if necessary.

9 REPORTING

9.1 Report first the size of cell used, and then the amounts of red, yellow and blue required to obtain a match. If neutral glasses are used to dull the sample, report them as an equivalent amount of 'Brightness'.

Example:

Colour, 25.4 mm cell: 0.7 red + 20 yellow + 0.0 blue + 1.0 Neutral (brightness)

9.2 Results obtained in one size of cell cannot be used to calculate the results which would have been obtained had a different size of cell been used.

10 Precision

The precision of this method has not yet been established.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Methods for Sampling and Test for Petroleum and Related Products of Natural or Synthetic Origin
(Excluding Bitumen) Sectional Committee, PCD 01

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SHRI HARI MOHAN MEENA
SCIENTIST 'C'/DEPUTY DIRECTOR
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